

## CLAIMS

1. A nanoparticle, useful for bioaffinity assays, comprising a self-assembling shell built up of several protein and/or peptide subunits, which protein and/or peptide subunits can be of one or several different types, assembled in an organized manner to form the shell having an inner surface facing the inside and an outer surface facing the outside of said particle wherein

a) one or several of the types of subunits have one or several first binding moieties per type of subunit with the binding moiety facing the outside of the particle for binding of any specific ligand binding protein; and

b) i) the particle contains within its shell a marker and/or

ii) one or several of the types of subunits have one or several second binding moieties per type of subunit with the binding moiety facing the inside and/or the outside of the particle for binding a marker; and

c) the marker or markers enable detection of the particle;

**characterised** in that the shell of the nanoparticle is a recombinant apoferritin or a an apoferritin-like particle.

2. The nanoparticle according to claim 1 **characterised** in that the marker is selected from the group consisting of an enzyme, luminescent protein, fluorescent or coloured protein or organic molecule and a rare earth metal.

3. The nanoparticle according to claim 2 **characterised** in that the marker is a protein, optionally an enzyme, selected from the group consisting of luciferase, GAO and GFP.

4. The nanoparticle according to claim 2 **characterised** in that the marker is a lanthanide preferably selected from the group consisting of Tb, Eu, Sm and Dy.

5. The nanoparticle according to claim 1 **characterised** in that one or several of the types of subunits have one or several third binding moieties per type of subunit

with the binding moiety facing the outside of the particle for binding to a solid support.

6. The nanoparticle according to any of preceding claims **characterised** in that a first binding moiety is selected from the group consisting of protein A, protein G, protein L, calmodulin binding peptide (CBP) and biotin carboxyl carrier protein (BCCP).

7. The nanoparticle according to any of claims 1 to 6 **characterised** in that a first binding moiety is an antibody against one of members of the group consisting of CRP, ABO blood group antigens and TSH.

8. The nanoparticle according to any of claims 1 to 6 **characterised** in that a second binding moiety is a binding moiety selected from the group consisting of protein A, protein G, protein L, calmodulin binding protein (CBP) and biotin carboxyl carrier protein (BCCP).

9. The nanoparticle according to any of claims 1 to 6 **characterised** in that a second binding moiety is an antibody against one of the group consisting of CRP, ABO blood group antigens and TSH.

10. The nanoparticle according to any of preceding claims **characterised** in that the minimum radius of the nanoparticle is from 10 to 40 nm.

11. The nanoparticle according to any of preceding claims **characterised** in that the number of subunits is more than 8, preferably more than 20.

12. Use of a nanoparticle according to any of preceding claims in a bioaffinity assay.

13. Kit for an immunoassay comprising the nanoparticle according to any of claims 1 to 9.